Full Featured Controller in a ⅛ DIN Package with DeviceNet™



The Watlow D8 series is a powerful line of controllers that combines performance and flexibility with compact design. Compliance with the ODVA and Semiconductor SIG standards means this controller is easy to integrate into systems with DeviceNet™ networks on CAN (Controller Area Network).

The four and eight loop versions of Series D8 controllers provide complete control solutions for a broad range of applications. Support for multiple types of sensor inputs including thermocouples, RTDs, linear voltage and current is also available.

Each loop can be individually configured for on-off control or PID control. Loops can be combined to achieve cascade, ratio or differential control. Process variable retransmit and remote analog set point are included.

The Series D8 controllers are UL® and C-UL® listed, meet the requirements of the European Community EMC Directive and carry the CE mark.

Features and Benefits

PID control of up to eight loops

- Minimal panel space per loop
- Reduced installation time
- More reliable, fewer parts mean fewer failures

Complies with ODVA (Open DeviceNet™ Vendors Association) and Semiconductor SIG (Special Interest Group) specifications for DeviceNet™ on CAN (Controller Area Network)

- Integrates with other DeviceNet™ nodes and software
- Sealed micro connector minimizes installation time and footprint while maximizing reliability
- Rotary baud rate and node address switches simplify setup
- Network and module status LEDs simplify commissioning and troubleshooting a network

Flexible, easy-to-use interface

- Easy setup with menu guided, full-text prompts
- Context-sensitive, on-screen help saves time

Advanced control utilities

- Auto-tune optimizes control with minimal effort and expertise
- Cascade minimizes overshoot and improves control in systems with excessive thermal lag
- Ratio and differential enhance control in areas where the relationship between two or more loops is paramount

UL® and C-UL® are registered trademark of Underwriter's Laboratories, Inc.
DeviceNet™ is a trademark of the Open DeviceNet Vendors Association

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DAC and SDAC Modules

The optional DAC and SDAC modules are available for Watlow D8 controllers.

DAC

The DAC (digital to analog converter) converts one or two of the controller's distributed zero crossing (DZC) output signals to analog signals. Each output is field configurable for 4-20mA⎓(dc), 0-5V⎓(dc), or 0-10V⎓(dc).

SDAC

The SDAC (serial digital to analog converter) converts one controller output to a precise analog voltage or current signal. The unit is typically used for process variable retransmit, open-loop, motor or belt speed control, or phase-angle fired SCR power controllers. The SDAC bears the CE mark and is UL® and C-UL® listed.

Because the D8 has no onboard analog outputs, applications that use process variable retransmit typically require one SDAC module per retransmitted signal.

Figure 1 - Front View

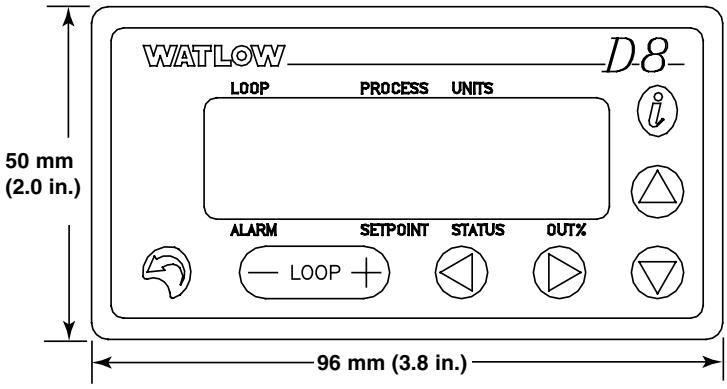


Figure 2 - Side View

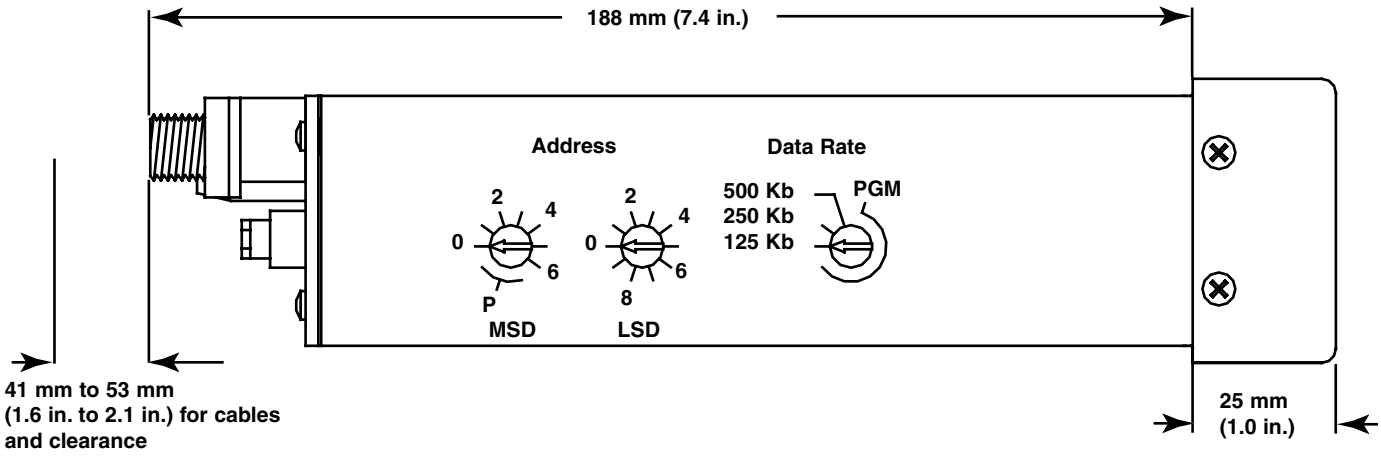


Figure 3 - D8 with TB18 Option for Digital I/O

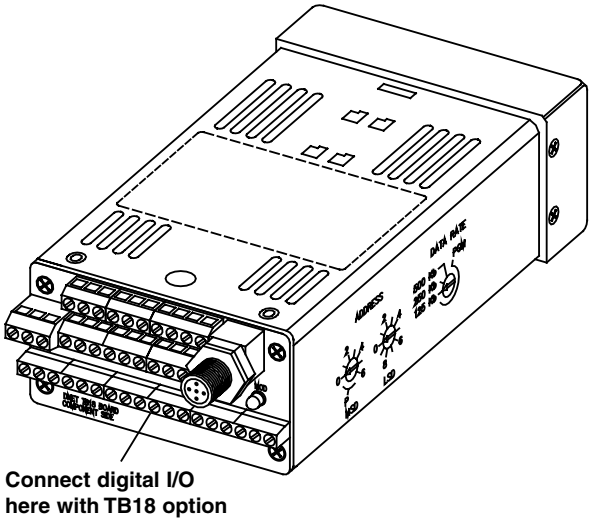
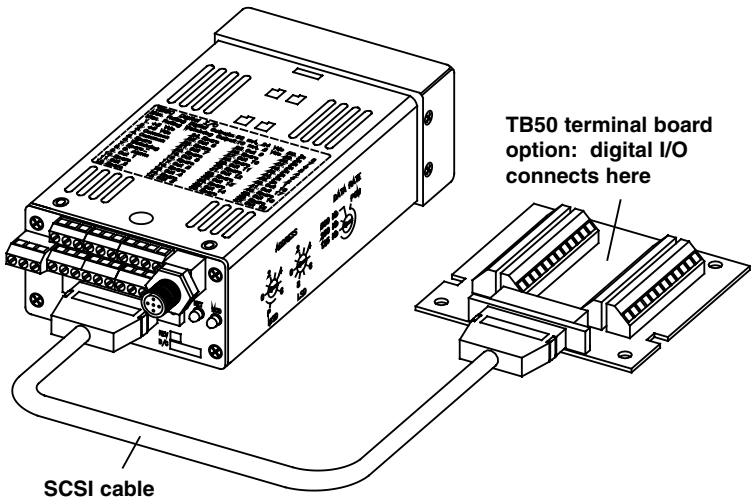


Figure 4 - D8 with SCSI/TB50 Option for Digital I/O



Specifications

Operator Interface
- 32-character vacuum florescent display
- Eight-key keypad to access guided menus and prompts, set values and view channel displays
- Built-in context sensitive help

Noise Rejection
- 120dB at 60Hz

Temperature Coefficient
- 40ppm/°C

Analog Inputs
- Thermocouples: User selectable type, direct connection, linearization, reference junction compensation, reversed and shorted T/C detection and upscale break protection with output averaging.
- RTD: 2 or 3 wire, platinum, 100Ω @ 0°C, DIN curve. Requires scaling resistors. See special inputs in ordering information.
- Linear: current and voltage signals from linear transmitter

Input Range and Accuracy

Sensor	Range (°C)	Range (°F)	Accuracy
Type B	66 to 1760°C	150 to 3200°F	±4.0°C
Type E	-200 to 787°C	-328 to 1448°F	±1.0°C
Type J	-212 to 760°C	-350 to 1400°F	±1.2°C
Type K	-268 to 1371°C	-450 to 2500°F	±1.3°C
Type R	-18 to 1766°C	0 to 3210°F	±2.8°C
Type S	-18 to 1760°C	0 to 3200°F	±2.8°C
Type T	-268 to 399°C	-450 to 750°F	±1.6°C
RTD	-200.0 to 621.1°C	-328.0 to 1150.0°F	±0.5°C

Note: Accuracy @ 25°C ambient. Valid for 10 to 100 percent of span except Type B, which is specified for 427°C (800˚F) to 1760˚C (3200˚F). RTD is for 100 percent of span.

Linear Voltage and Current Inputs
Requires scaling resistors. See special inputs in ordering information.
0-10mA⎓(dc)
0-20mA⎓(dc)/4-20mA⎓(dc)
0-100mV⎓(dc)
0-500mV⎓(dc)
0-1V⎓(dc)
0-5V⎓(dc)
0-10V⎓(dc)
0-12V⎓(dc)
Other ranges available. Consult factory.

Input Sampling Rate @ 60Hz
Each channel has the following scans per second:
- D84: Six samples per second, (update time: 0.167 sec.)
- D88: Three samples per second, (update time: 0.333 sec.)

Internal Measurement Resolution
- 0.006 percent, greater than 14 bits

Calibration
- Automatic zero and full scale

Digital Inputs
- TTL level used for logic, remote alarm acknowledge, selecting recipes or jobs
- Eight inputs with 50-pin terminal board option
- Three inputs with 18-pin terminal block option

Digital Outputs
- 18 digital outputs are available with a 50-pin terminal board option (See Figure 4 on previous page)
- 11 outputs available with 18-pin terminal block option (See Figure 3 on previous page)
- One or two control outputs are user assigned for each loop
- Each control output can be configured for on-off, time proportioning or distributed zero crossing
- Outputs sink up to 60mA each at 5V⎓(dc)
- 350mA at 5V⎓(dc) available from onboard supply

Alarm Outputs
- Independent process and deviation alarms for each channel
- Alarms can operate any output not used for control
- User programmable deadband, delay and startup suppression
- Global alarm output activates when any alarm occurs.
- Watchdog output indicates controller is functioning correctly

DeviceNet™ Interface
- Fully compliant with the interface guidelines for DeviceNet™ on semiconductor manufacturing tools
- Supports predefined master/slave connection set
- Group two only slave device
- Module status and network status LEDs
- Rotary baud rate and node address switches
- Hardware and software selectable baud rates: 125K, 250K and 500K
- Hardware and software selectable node address: 0 to 63
- Supports polled I/O and explicit messaging connections
- Polled I/O response: less than 1 millisecond
- Explicit message response: less than 50 milliseconds
- EDS (Electronic Data Sheet)
- Connector: 5 pin, micro style, sealed, male
- Optically isolated CANBUS interface
- Bus plug-able while hot
- Bus mis-wire protection

Line Voltage/Power
- 15 to 24 ± 3V⎓(dc) @ 1A (loaded) or 300mA (no load)

Agency Approvals
- UL®, C-UL® Listed: UL® 916, standard for energy management equipment
- CE Mark: Electromagnetic Compatibility (EMC) Directive 89/336/EEC
- ODVA conformance tested DeviceNet™

Ordering Information

D8
Code Number **D8 _ 0 - 0 0 0 0 - _ _ 0 _**

Number of Loops
4 = 4 loop controller
8 = 8 loop controller

Digital I/O Terminations
0 = TB18 (Screw terminals on the controller)
1 = SCSI connector, no terminal board or cable
2 = SCSI connector, TB50 terminal board and 3-foot cable
3 = SCSI connector, TB50 and 6-foot cable
4 = SCSI connector, TB50 and 3-foot right angle cable
5 = SCSI connector, TB50 and 6-foot right angle cable

Power Supply
0 = No power supply
1 = CE power supply

Special Inputs
0 = Thermocouples and -10 to 60mV inputs only
X = Number of current, voltage and RTD inputs

Special Inputs

Specify an input type for each channel or block of channels that needs factory installed resistors. Include a descriptor in the controller part description in the form specified below for each special input type. Make sure the number of special inputs specified is equal to the number of special inputs in the controller part number.

D 8 S I _ _ - _ _ _ _

Special Input Type
(Not required for thermocouple sensor inputs)
23 = RTD
43 = 0-10mA⎓(dc)
44 = 0-20mA⎓(dc)/4-20mA⎓(dc)
50 = 0-100mV⎓(dc)
52 = 0-500mV⎓(dc)
53 = 0-1V⎓(dc)
55 = 0-5V⎓(dc)
56 = 0-10V⎓(dc)
57 = 0-12V⎓(dc)

Start Channel
XX = Channel Number XX

End Channel
XX = Channel Number XX

Availability
Up to four weeks, depending on complexity and order release quantity. Consult factory for details.

DAC/SDAC Ordering Information

Code Number **D A C -**

DAC/SDAC Type
1 = Dual digital to analog converter module (converts two DZC control outputs to 0-5V⎓[dc] analog outputs).
2 = Dual digital to analog converter module (0-10V⎓[dc] analog outputs).
3 = Dual digital to analog converter module (4-20mA⎓[dc] analog outputs).
4 = Serial digital to analog converter module (SDAC); provides one high precision isolated voltage or current analog output (range is set from the controller).

Power Supply
A = None
C = 120/240V~(ac), 50/60Hz power supply adapter, (5V⎓[dc] @ 4A and 15V⎓[dc] @ 1.2A) Powers up to 13 SDAC modules or 12 dual DAC modules.

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